CLAIMS

1. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that at least one intermediate point and said other end of said antenna element are electrically connected via switches, respectively, to said ground conductor, the electrical length of said antenna element from said feeding point to said other end plus a connection line from said other end via one of said switches to said ground conductor and the electrical length of said antenna element from said feeding point to said at least one intermediate point plus a connection line from said at least one intermediate point via another one of said switches to said ground conductor are set to be capable of resonating different desired frequency bands respectively.

2. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that at least one intermediate point and said other end of said antenna element are electrically connected via series resonant circuits, each comprising a capacitor and a coil, respectively, to said ground conductor, the electrical length of said antenna element from said feeding point to said other end is set to make its resonant frequency equal to a resonant frequency of one of said series resonant circuits connected to

said other end, the electrical length of said antenna element from said feeding point to said at least one intermediate point is set to make its resonant frequency equal to a resonant frequency of another one of said series resonant circuits connected to said at least one intermediate point, and the resonant frequencies of said electrical lengths are set to different desired frequency bands respectively.

3. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that at least one intermediate point and said other end of said antenna element are electrically connected via filters, respectively, to said ground conductor, one of said filters connected to said other end allows passage of a resonant frequency with which the electrical length of said antenna element from said feeding point to said other end resonates, another one of said filters connected to said at least one intermediate point allows passage of a resonant frequency with which the electrical length of said antenna element from said feeding point to said at least one intermediate point resonates, each of said filters blocks passage of a frequency other than the resonant frequency with which said electrical length to the position to which the filter is connected resonates, and the resonant frequencies of said electrical lengths are set to different desired frequency bands respectively.

4. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that one intermediate point and said other end of said antenna element are electrically connected via parallel resonant circuits, each comprising a capacitor and a coil, respectively, to said ground conductor, the electrical length of said antenna element from said feeding point to said other end is set to make its resonant frequency equal to a resonant frequency of one of said parallel resonant circuits connected to said one intermediate point, the electrical length of said antenna element from said feeding point to said one intermediate point is set to make its resonant frequency equal to a resonant frequency of another one of said parallel resonant circuits connected to said other end, and the resonant frequencies of said electrical lengths are set to different desired frequency bands respectively.

5. The antenna for multiple bands according to any of claims 1 to 4, characterized in that a matching circuit is inserted between said feeding point and the one end of said antenna element and said electrical lengths including said matching circuit are set.

6. The antenna for multiple bands according to any of claims 1 to 4, characterized in that a short capacitor or an extension coil is inserted between said other end of said antenna element

and said ground conductor and/or between said intermediate point and said ground conductor, said resonant frequencies of the electrical lengths including said short capacitor or said extension coil are set to said desired frequency bands, and each of resonant frequencies of the electrical lengths not including said short capacitor or said extension coil is set not to close to any other one of said frequency bands.

7. The antenna for multiple bands according to any of claims 1 to 4, characterized in that a capacitor is inserted in series or capacitance is coupled between said feeding point and an intermediate point with the shortest electrical length from said feeding point.

8. The antenna for multiple bands according to any of claims 1 to 4, characterized in that two parallel conductors disconnected in direct current are inserted in series so as to be inductively coupled together between said feeding point and an intermediate point with the shortest electrical length from said feeding point.

9. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said antenna element is formed in a meandering pattern.

10. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said antenna element is formed

on the surfaces of a dielectric.

11. The antenna for multiple bands according to claim 3, characterized in that said antenna element and said filters are arranged on a dielectric.

12. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in an approximate rectangle and said antenna element is formed, bordering on one short side of said rectangle, separated from said ground conductor.

13. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in an approximate rectangle on a flat substrate and said antenna element is formed on said substrate, bordering on one short side of said rectangular ground conductor, separated from said ground conductor.

14. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in a rectangle, said antenna element is formed, bordering on one short side of the rectangle, separated from said ground conductor, and said antenna element is formed in a meandering pattern turned around repeatedly in a direction parallel to the long sides of said rectangular ground conductor.

15. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in a rectangle, said antenna element is formed, bordering on one short side of the rectangle, separated from said ground conductor, and said antenna element is formed in a meandering pattern turned around repeatedly in a direction parallel to the short sides of said rectangular ground conductor.

16. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in a rectangle, said antenna element is formed, bordering on one short side of the rectangle, separated from said ground conductor, one part of said antenna element is formed in a meandering pattern turned around repeatedly in a direction parallel to the long sides of said rectangular ground conductor, the remaining part of said antenna element is formed in a meandering pattern turned around repeatedly in a direction parallel to the short sides of said rectangular ground conductor.

17. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said ground conductor is formed in a rectangle, said antenna element is formed, bordering on one short side of the rectangle, separated from said ground conductor, a half part of said antenna element from its one end which is electrically connected to said feeding point is formed in a meandering pattern turned around repeatedly in a direction parallel to the long sides of said rectangular ground conductor,

and the remaining half part of said antenna element up to the other end which is electrically connected to said ground conductor is formed in a meandering pattern turned around repeatedly in a direction parallel to the short sides of said rectangular ground conductor.

18. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said antenna element is formed in a meandering pattern along an imaginary circular cylinder plane and one end, the other end, and an intermediate point of said antenna element are positioned so that they can be connected to and disconnected from said feeding point and the switches, the series resonant circuits, the parallel resonant circuits, or the filters.

19. The antenna for multiple bands according to any of claims 1 to 4, characterized in that said antenna element is formed in a meandering pattern along an imaginary circular cylinder plane and one end, the other end, and an intermediate point of said antenna element are positioned so that they can be connected to and disconnected from said feeding point and the switches, the series resonant circuits, the parallel resonant circuits, or the filters, and, in a casing in which said feeding point and the switches, the series resonant circuits, the parallel resonant circuits, or the filters are housed, said antenna element is installed in a position so as to protrude outside and to be removable.

20. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that at least one intermediate point and said other end of said antenna element are electrically connected via any of a switch, a series resonant circuit comprising a capacitor and a coil, and a filter, respectively, to said ground conductor, the resonant frequency of said series resonant circuit or the pass frequency of said filter is set equal to a resonant frequency of the electrical length of said antenna element from said feeding point to said intermediate point or said other end to which said series resonant circuit or said filter is connected, and the electrical length of said antenna element from said feeding point to said intermediate point and the electrical length of said antenna element from said feeding point to said other end are set to be capable of resonating with different desired frequency bands respectively.

21. An antenna for multiple bands in which one end of an antenna element is electrically connected to a feeding point and the other end thereof is electrically connected to a ground conductor, characterized in that said other end of said antenna element is electrically connected directly to said ground conductor, at least one intermediate point of said antenna element is electrically connected via any of a switch, a series resonant circuit comprising a capacitor and a coil, and a filter to said

ground conductor, the resonant frequency of said series resonant circuit or the pass frequency of said filter is set equal to a resonant frequency of the electrical length of said antenna element from said feeding point to said intermediate point to which said series resonant circuit or said filter is connected, and the electrical length of said antenna element from said feeding point to said intermediate point and the electrical length of said antenna element from said feeding point to said other end are set to be capable of resonating with different desired frequency bands respectively.